Rotman School of Management
University of Toronto

The Cost of Equity Capital and Fair Rate of Return on Equity (ROE) for a Canadian Utility

Professor Laurence Booth
CIT Chair in Structured Finance
Rotman School of Management
University of Toronto
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Introduction

The cost of capital and fair return on equity (ROE) is a major source of contention in rate hearings, since there is little objective data as to its value yet it is of vital importance both to ratepayers and shareholders. Frequently expert witnesses present their estimates and recommendations using a variety of different techniques which often come to radically different conclusions. It is hardly surprising, therefore, that Canadian regulators have increasingly dispensed with such evidence in favour of formulaic ROE adjustment mechanisms. However, even these formulae are increasingly under attack as companies request a review of the ROE formula, or a premium to the ROE or common equity ratio, based on claims of increased risk or dubious comparisons with firms in other countries, notably the United States.

I was involved in the hearings that lead to many of the ROE adjustment formulae on behalf of interveners[1] and some subsequent hearings that have reviewed them and am always forced to respond to issues raised by the utility. In this paper I have been asked to discuss the major issues involved in setting the ROE. To this end I will first discuss the general principles as to why utilities are regulated and why the ROE adjustment formulae have basically got it right. I will then discuss the problems in estimating the overall market risk premium and why increased globalisation tends to reduce, not increase, risk premiums. Finally, I will discuss the unique risk of regulated utilities and why the market to book ratio is a useful check as to whether or not the allowed ROE is fair.

I should add that the issues I will discuss are the broad issues affecting the ROE. In the short space allotted I can not discuss all the issues raised in a normal hearing nor discuss the business risk of a typical utility in any detail. This paper is focussed more tightly on the underlying economic principles that constrain the fair ROE, since frequently in hearings these issues are not fully developed.

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[1] My testimony was with my late colleague Dr. Michael Berkowitz. Others in this volume will provide the utility perspective.

General Principles

Utilities and pipelines are special types of firms, since they are regarded as having market (monopoly) power and are thus regulated or operated under state control. Otherwise, a basic proposition from micro-economics is that they will abuse their market position and act detrimental to the public interest by charging higher prices and earning excessive profits. The specifics of regulation will vary across jurisdictions and the types of firm, but the general prescription is that the rates be “fair and reasonable.” This allows the regulator to examine the costs required to provide service including the fair ROE or cost of equity capital.

One key characteristic of a utility is that they are capital intensive and sell a service which is difficult to resell. Classic examples are pipeline and transmission and distribution utilities. Other capital intensive firms like telephone utilities and airlines have also been similarly regulated in the past, but technological developments have allowed regulators to *forbear* that regulation as new forms of competition have emerged. Similarly other capital intensive firms, like the car manufacturers, produce a tangible good that can be stored and transported and thus face competition from other producers despite their capital intensity. It is for this reason that most of the commodities transmitted by a regulated utility, like natural gas, oil and electricity are generally no longer subject to regulation.

An example of a regulated utility would be TransQuebec and Maritimes Pipelines (TQM), which for 2007 had the following abbreviated income statement:

Revenues	$83.7 million
Operating and maintenance expenses	15.2
Depreciation	23.9
Taxes and NEB recoveries	12.2
Interest	19.8
Other Income	0.2
Net Income	12.8

The important feature is that financial costs, that is depreciation, taxes, interest and net income cover the vast bulk of TQM's cost of service, only operations and maintenance expenses at 18% of revenues are directly under the company's control.[2] All of the financial costs except the return to the common shareholders, that is, TQM's net income, can be forecast very accurately, but the cost of equity capital requires significant judgement. The determination of the cost of equity capital thus becomes a significant factor in whether TQM's tolls are fair and reasonable.

In the *BC Electric* decision the Supreme Court of Canada adopted Mr. Justice Lamont's definition of a fair rate of return as enunciated in the *Northwestern Utilities Limited v. City of Edmonton* ([1929] S.C.R. 186) decision that:

> "By a fair return is meant that the company will be allowed as large a return on the capital invested in its enterprise (which will be net to the company) as it would receive if it were investing the same amount in other securities possessing an attractiveness stability and certainty to that of the company's enterprise."

Mr. Justice Lamont's definition embodies what a financial economist would call a risk-adjusted rate of return or "opportunity cost" and arose as a result of changed conditions in the "money" market.

The General Approach to Estimating the Fair return

In determining a fair return most Canadian jurisdictions have opted for a ***risk premium*** model. The basic model is

$$AROE = R_C + URP + x$$

where the Allowed Return on Equity (AROE) is set equal to the long Canada bond yield (R_C) plus a utility risk premium (URP) and a floatation or issuing cost allowance (x). However, often the flotation cost allowance and risk premium are collapsed into one all in utility risk premium.

The flotation cost allowance is normally set at 0.50%, so that the utility's stock price is always above book value, that is, the market to book ratio exceeds 1.0. This is so that the utility can

[2] TQM has contracted out the bulk of its O&M expenses in return for a fixed fee partially indexed contract.

issue new shares, and incur issue or flotation costs and yet still net out book value from the issue. In this way the common shareholders do not suffer any dilution of their ownership in the firm. It is these costs that separate the investor's required return and the market required utility risk premium from the fair ROE. However, these costs are small for utilities. The major issue is estimating the investor's required rate of return.

The basic risk premium model used to estimate the investors' required rate of return is called the capital asset pricing model (CAPM), which is the workhorse of modern portfolio theory. It was developed by Professor William Sharpe (1964) from the pioneering work on portfolio theory of Professor Harry Markowitz (1952) for which they both won the Nobel prise in economics. Other more sophisticated models have been developed since 1964, including the Arbitrage Pricing Model (APT) of Stephen Ross (1976) and the three factor model of Eugene Fama and Ken French (1993). However, the CAPM is overwhelmingly the most popular model actually in use by companyies to estimate the investor's required rate or return, which from their perspective is the cost of raising equity capital.[3]

The CAPM estimates the required rate of return for any security (K_j) as

$$K_j = R_F + MRP * \beta_j$$

which is equal to the risk free rate (R_F) plus the market risk premium (MRP) times a security's beta coefficient (β_j). Many have said "how interesting the CAPM replaces estimating one thing with estimating three." However, its advantages are that the three new components can all be estimated with more precision and thus constrain the range of estimates of the required rate of return.

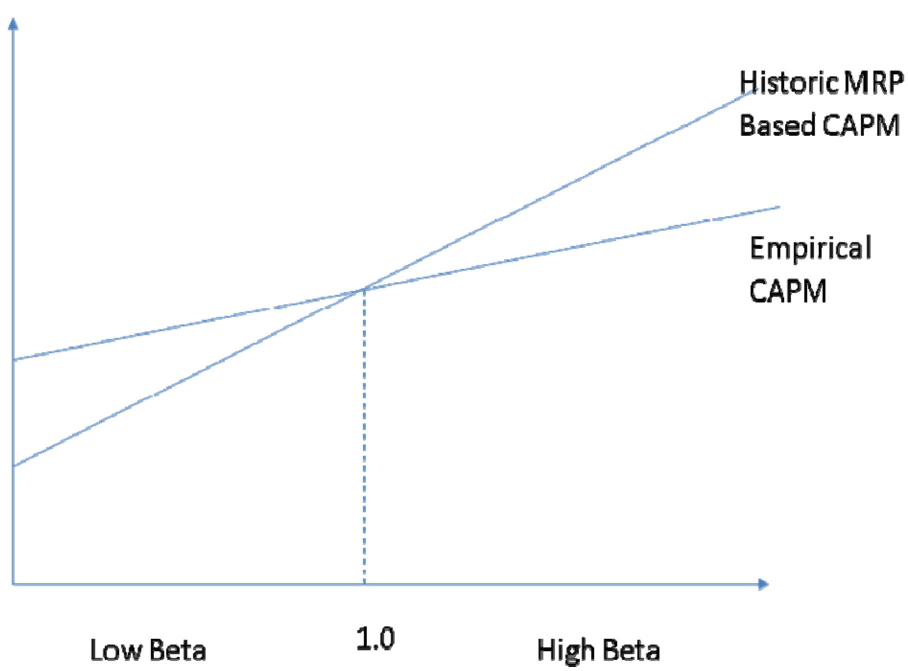
In its application to public utilities The CAPM is normally implemented using the long Canada bond yield as the risk free rate. There are two reasons for this. First, the short term Treasury bill yield is highly variable and influenced by monetary policy and the business cycle; it also represents a "short term" risk free rate since the assumed investment horizon is by definition

[3] See the major survey work of Graham and Harvey (2001).

very short. More significantly, utilities have a long term financing need since they are so capital intensive and usually need a long time to recover their capital investment.[4] As a result, they are generally viewed as long term investments.

The second two components are the major contribution of the CAPM, which is that you can split the risk premium into two parts. The first part is the market risk premium and the second the beta coefficient, which adjusts this market risk premium up and down for the relative risk of a particular security. Overall, the market's beta coefficient is 1.0, so that high risk stocks have betas greater than 1.0 and low risk stocks betas less than 1.0.

Empirical testing of the CAPM has been a major academic exercise for over 40 years and the profession is still divided. Many believe[5] that the CAPM is important, but is consistently biased against certain types of shares. In particular, low beta stocks tend to earn higher rates of return than predicted by the CAPM and high beta stocks less. This has given rise to the use of the Empirical CAPM or ECAPM. The difference can be seen in the following graph.



[4] Some of Ontario Power Generation's hydro plants are over 100 years old.
[5] See the classic tests of Black, Jensen and Scholes (1972) and Fama and McBeth (1973)

In the graph the CAPM using the Treasury Bill yield and the historic market risk premium over Treasury bill yields results in lower estimated returns for low beta stocks than the empirical experience and vice versa for high beta stocks.

However, the ECAPM is derived from empirical tests using the 30 day Treasury Bill return as the risk free rate, whereas in regulatory work the long Canada bond yield is normally used, which on average is about 1.10% more. Further the market risk premium in regulatory work is normally measured as the return on the market minus the return on the long bond, which again results in a smaller market risk premium than using Treasury Bills as the risk free asset. Consequently the way the CAPM is used in regulatory work automatically increases the intercept and decreases the market risk premium in line with the empirical experience. It is then double counting to make these adjustments again.

Also betas are estimated with considerable error and although the empirical tests have developed procedures to minimise these errors, they can still be substantial. As a result, the CAPM is normally applied in regulatory work using the long Canada bond yield as the risk free rate, a market risk premium of equities over the long bond return and an estimated forward looking beta estimate rather than the recent actual beta coefficient as in the empirical tests. I term such an application of the CAPM the "classic" CAPM model even though it is modified from the way that most academics teach it.

AROE Adjustment Mechanisms

The CAPM is heavily relied on by Canadian regulators, but since 1993 and a decision of the BC Utilities Commission[6] most regulators have fixed the allowed ROE through a formula adjustment. The BCUC has adjusted its formula several times, but in 1994 the National Energy Board developed it own ROE adjustment formula, which has remained in force ever since. The NEB formula ROE is

$$AROE = 9.25 + 3.00 + 0.75(LTC - 9.25)$$

[6] BCUC Decision, June 10, 1994.

The NEB AROE in 1994 was based on a 9.25% forecast long Canada bond yield[7] plus a 3.0% "all in utility risk premium," that is, the actual risk premium plus a flotation cost allowance. This allowed ROE then adjusts by 75% of the change in the forecast long Canada bond yield from 9.25%. For example, if the forecast long Canada bond yield is 5.25%, or a 4% decline from the 1994 forecast, then the AROE drops by 75% of this decline or 3% from 12.25% to 9.25%. This allowed ROE then consists of the forecast long Canada yield of 5.25% plus a 4.0% all in utility risk premium. In this way the allowed ROE does not drop by the full amount of the decline in the long Canada bond yield, instead the risk premium increases. In the example with the NEB formula the risk premium increases by 25% of the drop in the long Canada bond yield. That is the utility risk premium increases from the 3.0% as estimated by the NEB in 1994 to the 4.0% level as the long Canada bond yield forecast drops from 9.25% to 5.25%.

The ROE formula approach has been adopted by most Canadian regulators and proven highly successful in that it has withstood a variety of reviews in several jurisdictions.[8] However, it begs the question as to whether the utility risk premium should increase as the long Canada bond yield decreases? At the time of the 1994 NEB hearing, my late colleague Dr. Berkowitz and I proposed an 80% ROE adjustment mechanism, which means a 20% adjustment in the utility risk premium. Other intervener witnesses proposed 100% ROE and 0% risk premium adjustment, whereas witnesses on behalf of the companies generally proposed 50% adjustment to both. The NEB decision bracketed the recommended range from a 50% to a 100% adjustment of the ROE or a 0% to 50% adjustment of the utility risk premium to changes in the long Canada bond yield.

To understand why I felt a 50% adjustment of the utility risk premium was excessive you have to remember that utilities are less risky than the market as a whole. Normally I estimate their relative risk at 50%, so that this means that if the utility risk premium adjusts by 50% of any change in the long Canada bond yield then the market risk premium adjusts by 100%. That is,

[7] The forecast is based on the Consensus Economics forecast for the ten year bond yield plus the spread between the 30 and ten year bond yield immediately prior to the test year

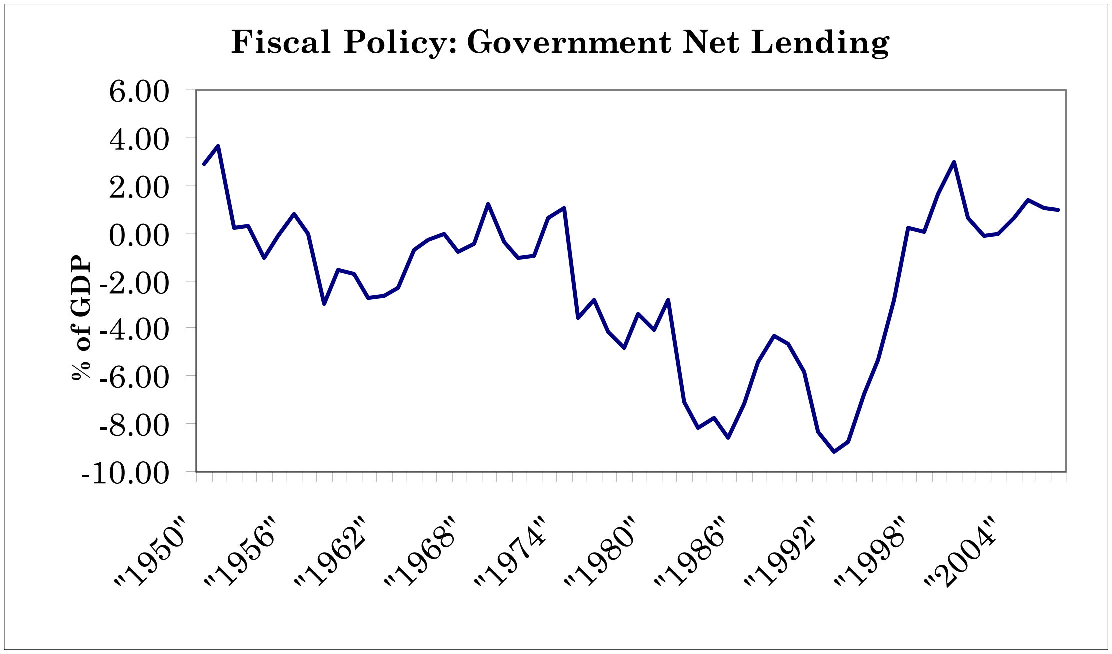
[8] Similar approaches are in use before the Manitoba Public Utility Board, the Alberta Utilities Commission, the Ontario Energy Board and the Regie d'Energie in Quebec.

the change in the market risk premium *entirely* offsets any reduction in the long Canada yield to keep the expected return constant.

For example in 1994 the NEB utility risk premium was 3.0%, if the utility beta was also 50% then the market risk premium was 6% for a return on the market of 15.25%. If the long Canada bond yield then drops to 5.25%, with a 50% adjustment the allowed utility ROE only drops by 2.0% to 10.25% so that the utility risk premium increases to 5.0%. However, with a 50% beta coefficient this means the market risk premium has increased to 10% or the market return is constant at 15.25%. I argued in 1994 that it was implausible to believe that the market return is invariant to changes in the long Canada bond yield. I also believed that at that time the long Canada bond yield contained a risk premium that caused the utility risk premium to narrow, making a 0% adjustment of the risk premium equally implausible. Consequently, I felt that an adjustment between these two extremes made sense.

With hindsight the NEB formula has proven remarkably successful and delivered fair utility ROEs for the last 14 years. To understand why, we have to remember that the long Canada bond yield in 1994 was itself highly risky. At that time the Government of Canada (GOC) was running a huge fiscal deficit and flooding the market with government debt. This was because Canada was struggling to adapt to free trade with the US as well as a normal cyclical downturn, which together cut tax revenues and increased government spending. In turn the government financing forced up long Canada bond yields as investors feared that the government would not cut its spending and keep inflation under control.

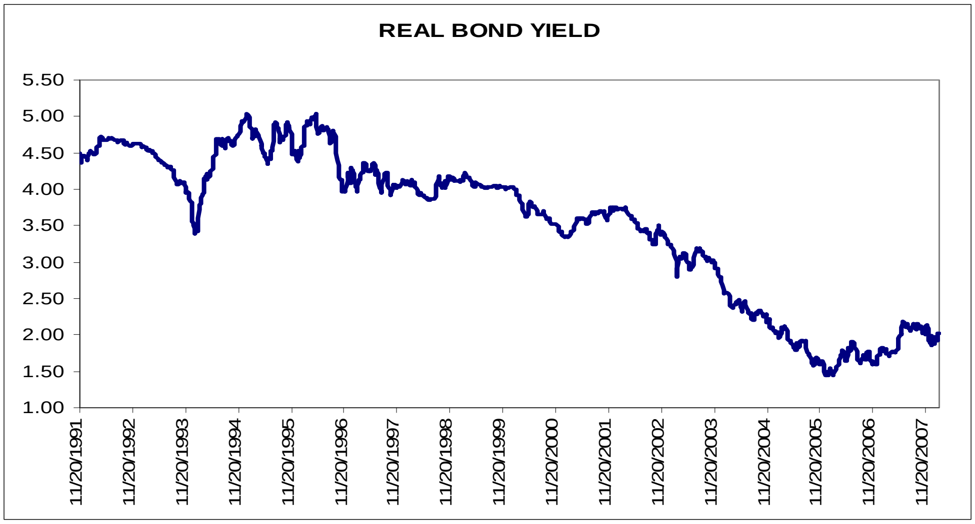
In the following graph is the aggregate government lending (provinces plus GOC) scaled by gross domestic product (GDP). In the early 1990's government lending was negative, that is, borrowing, and approaching 10% of GDP. This situation was clearly unsustainable as the markets were requiring higher and higher real yields on Canada debt.



In response the Government of Canada introduced a real return bond and a policy of inflation targeting jointly agreed to with the Bank of Canada. The twin objectives were for the government to take the risk of inflation getting out of control[9] and to get the Bank of Canada to keep inflation at a 2% target level in a band of 1.0-3.0%.[10] Further serious efforts were made at controlling government spending to reduce the fiscal deficit. As the graph indicates by 1997 the budget approached surplus and has been in positive territory ever since. In aggregate, the government sector has paid down a significant amount of debt and reduced the flood of government debt coming on to the capital markets. This in turn has freed up capital for productive investments.

As the following graph indicates the real bond yield has gradually come down as fiscal deficits have come under control. In the early 1990s the yield on the real return bond was 4.5% but as fiscal problems have receded, it has dropped by over 2.0% to the current level of 2.44% and at times has been well under 2.0%. This drop in the real yield reflects the drop in the supply of government bonds and the consequent reduction in pressure that government financing has imposed in the markets.

[9] This is because with the real return bond the government has to pay back more at maturity if inflation increases.
[10] This is the current target, see the October 2008 Monetary Policy Report of the Bank of Canada.

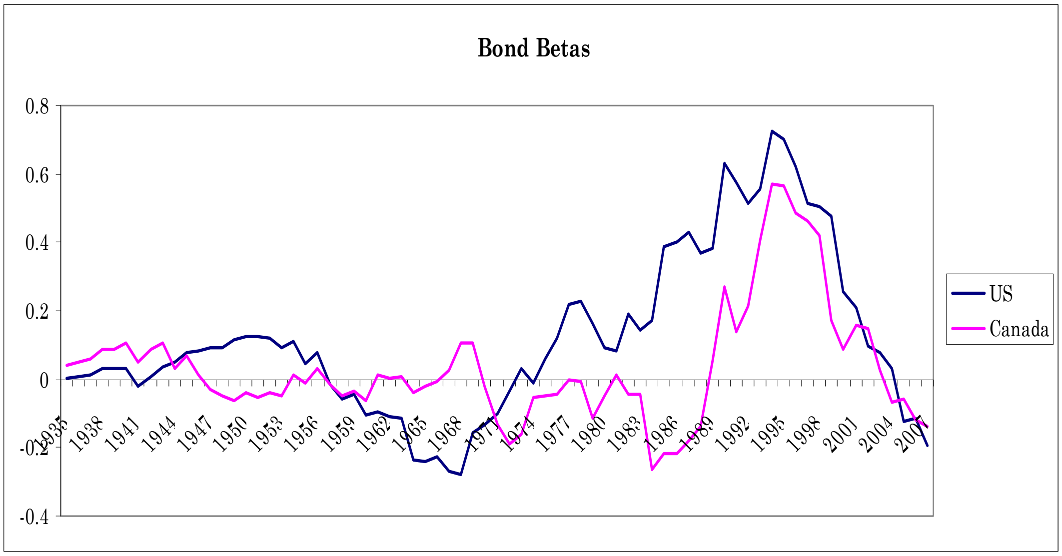


Once it is recognised that the long Canada bond was risky at the time the NEB formula was introduced it means we can approximate its expected returned by the CAPM like any other security. In this case we have

$$R_C = R_F + MRP * \beta_C$$

This says that the yield on the long Canada bond (R_C) is equal to the risk free rate plus the market risk premium times the beta on the long Canada bond. In this case the market risk premium is understood to be the market risk premium over the true risk free rate, which is no longer the long Canada bond.

So the question is how risky was the long Canada bond in 1993-4; the time of the introduction of ROE adjustment formulae? To answer this we can look at government bond betas in both the US and Canada which are graphed below.



These estimates are "backward looking and capture the riskiness of the government bond over the previous ten years.

What is clear from the graph is that bond betas were largely non-existent until the 1980s, but as interest rates become more volatile these bond betas started to increase. For the period 1985-1995 bond betas reached a high of about 0.50 in the US and Canada and had very similar market risk to utilities. To illustrate, if the true market risk premium is taken to be 5.0%, then a bond beta of 0.40 means there was a risk premium embedded in the long Canada bond yield of about 2.0%. This is of a similar order of magnitude to the drop in the yield on the real return bond since the mid 1990's. In this case the forecast long Canada bond yield in 1994 of 9.25% could be approximately represented as

$$R_C = R_F + MRP * \beta_C$$
$$R_C = 7\% + 5\% * 0.4$$

where 7% could be regarded as the "true" risk free rate given a 4-5% rate of inflation and 2% would be the risk premium embedded in the long Canada bond yield.[11]

[11] The CPI rate of inflation was 5.61% in 1991 and had dropped by 1994 due to the recession. These numbers are illustrative.

What this means is that when the market risk premium was estimated over the long Canada bond in the early to mid 1990's it would have been smaller than now to reflect the risk premium in the long Canada bond yield. Further with the removal of this risk premium it should now have increased back to more "normal" levels.[12] Further it is doubtful that utilities even deserved much of a risk premium over the long Canada bond yield in the 1990s, given the risk premium already embedded in those long Canada bond yields and the observation that utility betas are generally around 0.50. That is, for example, given a 5% market risk premium absent the risk premium in long Canada bonds at the time, the actual market risk premium over long Canada bonds would itself have been relatively small at 3.0%,

Since 1995 the improving fiscal position of government in Canada has lead to less pressure in the market from government bond financing, less interest rate volatility and a decline in the impact of interest rates on the overall stock market. As a result the beta of the long Canada bond has declined along with the yields on both the nominal and real return bond. This has caused the market risk premium over the long Canada bond to revert back to its more normal long run value. In turn this has caused the utility risk premium to increase over the level found to be fair by the NEB in 1994.

What this means is that the NEB and other jurisdictions adopting similar ROE adjustment formulae have essentially got it right. Although there is no reason to believe that the 0.75 adjustment perfectly matches changes in the capital market, the decline in the long Canada bond yield has caused the utility risk premium to increase. This trend is in line with the way that the risk premium has gradually been removed from the long Canada bond yield since 1994 causing the market risk premium to increase.

Estimates of the Market Risk Premium

In the previous section I used 5.0% as an estimated market risk premium measured over long Canada bonds. The reason for this is that this is approximately what has been earned over the

[12] In 1992 before the CRTC Dr. Berkowitz and I estimated the market risk premium at 2.25-3.25% and then increased it to 3.0-3.5% in 1993 and then 3.5-4.0% before the NEB in 1994.

last 80 years. For example, in the following table are the average annual rates of return earned on equities and bonds in both the US and Canada since 1926. In both cases the return includes capital gains and losses plus cash distributions as dividends and interest income.

Annual Rates of Return 1926-2007						
	USA			Canada		
	S&P500	US Treasuries	Excess	TSX Composite	Long Canadas	Excess
Arithmetic	12.25	5.83	6.43	11.64	6.47	5.18
Geometric	10.35	5.47	4.89	10.07	6.12	3.95
OLS	11.19	4.93	6.20	10.48	5.67	4.80
Volatility	19.96	9.02		18.36	8.86	

The equity series are the Standard and Poors 500 index for the US and the TSX Composite (formerly TSE300) for Canada. The bond series are long US Treasuries and long Canadas for the US and Canada respectively.

For both equities and bonds there are three estimates, to understand why consider a stock that goes from $1 to $2 and then back to $1 over two years. The annual rates of return are 100% ($1 to $2) and -50% ($2 to $1) so that the simple average is +25%. This is the *arithmetic* rate of return. However, telling an investor they earned 25% over two years when they have the same $1 they started with is misleading. The reason being that the 100% was earned on $1 while the -50% was earned on $2 so that the investor ended up with the starting $1. For this reason we normally estimate compounded or *geometric* rates of return and find out what rate of return compounds the starting amount to get the ending amount. Clearly in our example this is 0%. Finally OLS is the ordinary least squares estimate of the arithmetic return, the *OLS* estimate is often a better statistical estimate of the average rate of return than the arithmetic mean.

Note, from the table the geometric return is always the lowest, since the arithmetic return is increased by the volatility in the annual rates of return. The arithmetic return is approximately the geometric return plus half the variance of the annual rate of return; so for US equities, for example, the standard deviation of the annual return is 19.96% or approximately 0.2 so half the variance is about 0.02, whereas the actual difference between the arithmetic and geometric returns was 0.019. Normally we use geometric returns for estimating long run rates of returns on portfolios, since in a broad sense the geometric mean of 10.35% is the arithmetic return from buying US equities in 1925 and holding them until 2007. However, for Canadian utilities on an annual adjustment to the ROE, we normally assume an annual holding period and use the arithmetic return as the best estimate of the expected return over the next year.

For US equities the Arithmetic and OLS mean returns of 12.25% and 11.19% minus the US Treasury bond returns of 5.83% and 4.93% mean excess returns of 6.43% and 6.20% respectively. They are termed excess returns, since that is what they are; the actual return experienced on equities in excess of that on long term bonds over a very long period of time. For this reason the excess is often referred to as an earned risk premium. However, only if we assume that history exactly repeats itself, and investors expect this to happen, is this earned risk premium an accurate estimate of the current market risk premium. For Canada the same estimates are 5.18% and 4.80% or 1.25% and 1.40% lower than the US estimates respectively.

Taking the arithmetic return estimates we can see the reason for the difference as reported below.

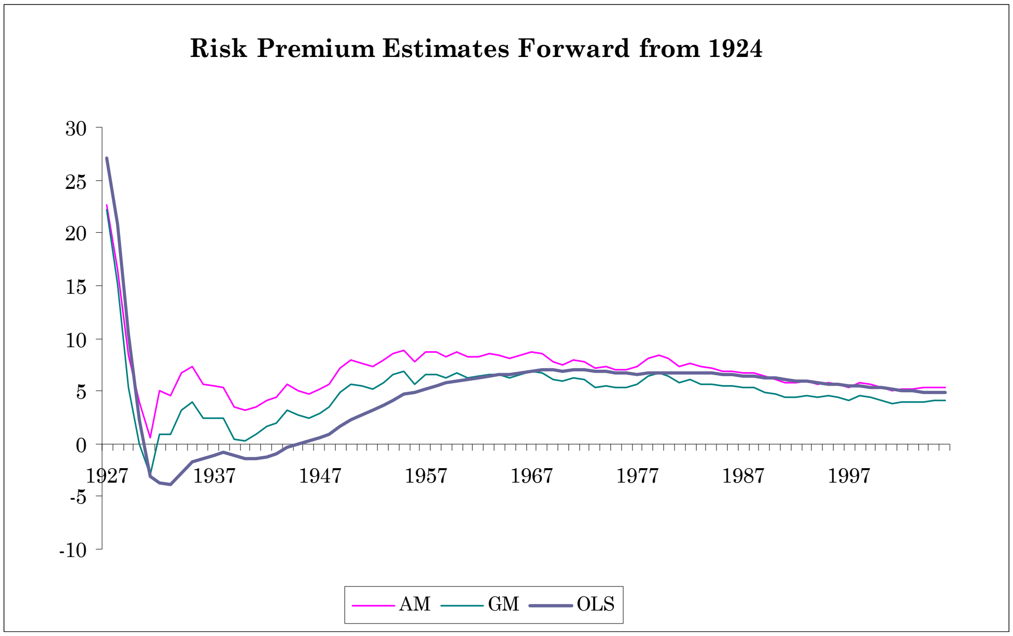
	Equity	Government Bonds	Excess
Canada	11.64	6.47	5.18
USA	12.25	5.83	6.43
Difference	+0.61	-0.64	1.25

US equity returns have been 0.61% higher than in Canada, while US government bond returns have been 0.64% lower, so the difference between the earned risk premiums is approximately equally split between the equity and bond markets. There are rational explanations for both these differences. The US Treasury Bond is the most liquid in the world and as the major reserve currency there is a natural tendency for the US Treasury bond to trade on a lower yield than long Canada bonds, all else equal. This in fact has been the history up until the last decade when increasing budget surpluses in Canada have lead to a decline in the long Canada yields and caused them to drop below those on US Treasuries. Similarly it has been Canadian government policy to keep equity capital in Canada either through explicit portfolio restrictions on holding foreign securities in tax preferred saving plans or tax preferences such as the dividend tax credit or the impact of with-holding taxes on foreign source income.[13] All these measures have tended to reduce the required rate of return on Canadian equities by keeping capital in Canada.

The data in the previous tables provide a snap shot of what the earned equity risk premium has been using the whole time period. However, the equity market return, in particular, is highly volatile, so to make sure the estimates are reasonable we can look at how stable the estimate is. We can do this by checking to see how the earned risk premium has evolved over time and by looking at different sub periods.

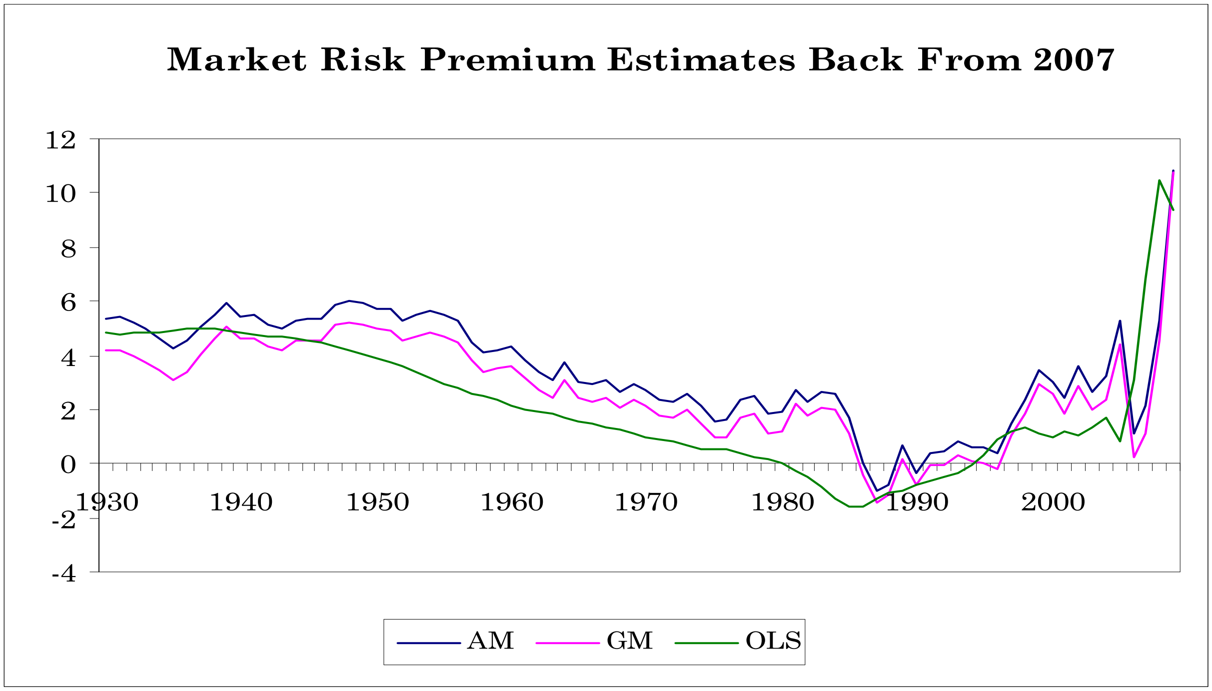
One way of checking the evolution of the earned risk premium is to see what was earned over the first five years and then progressively add more and more data. This is done below for the Canadian data which starts in 1923, so the first observation is for the period 1923-1927.

[13] Over time these barriers have gradually been reducing in importance but they still exist, giving rise to a "home bias" in equity portfolios.



We can clearly see the huge equity market gains made prior to the Great Crash of 1929, the subsequent losses and the recovery from the Depression. However, it is also clear that the size of the earned equity risk premium peaked in the mid 1970's at well over 5.0% and since then has been gradually declining to end at the 5.18% estimate from the table.

One drawback of this chart is that it gives a spurious air of stability in the equity risk premium, since the early data is in the chart for every period, whereas the most recent data only appears in the latter observations. To correct for this we can do the opposite and start for the last five year period 2003-2007 and then go back in time to add older data. In many ways this is more accurate since it is consistent with the experience of current market professionals; very few of whom remember what happened in the 1920's and 1930's. The data is graphed below.



This graph should be read from right to left and starts with the most recent good stock market performance since 2002-3. However, as you go back and include data from the 1990's and 1980's the earned risk premium becomes negative. This means that for the period from the mid 1980s to 2007 bonds outperformed equities so that the earned market risk premium was negative. As you then go back into the 1970s the earned risk premium increases until by the 1950's it gets to the 5.0% level and again finishes at 5.18%.

The message from these two graphs is quite different. In both cases they "home in" on the 5.18% overall market risk premium estimate, but whereas the "going forward" analysis emphasises the fact that the market risk premium has been falling; the "going back" analysis indicates that it increases above a skimpy 2.0% level only by going back almost thirty years. This analysis also explains why some analysts have recently pegged the equity over bonds risk premium at around 2.0%.[14]

The data in these two figures indicate that there is considerable volatility in earned risk premiums due to the enormous uncertainty in the investment returns from both equities and

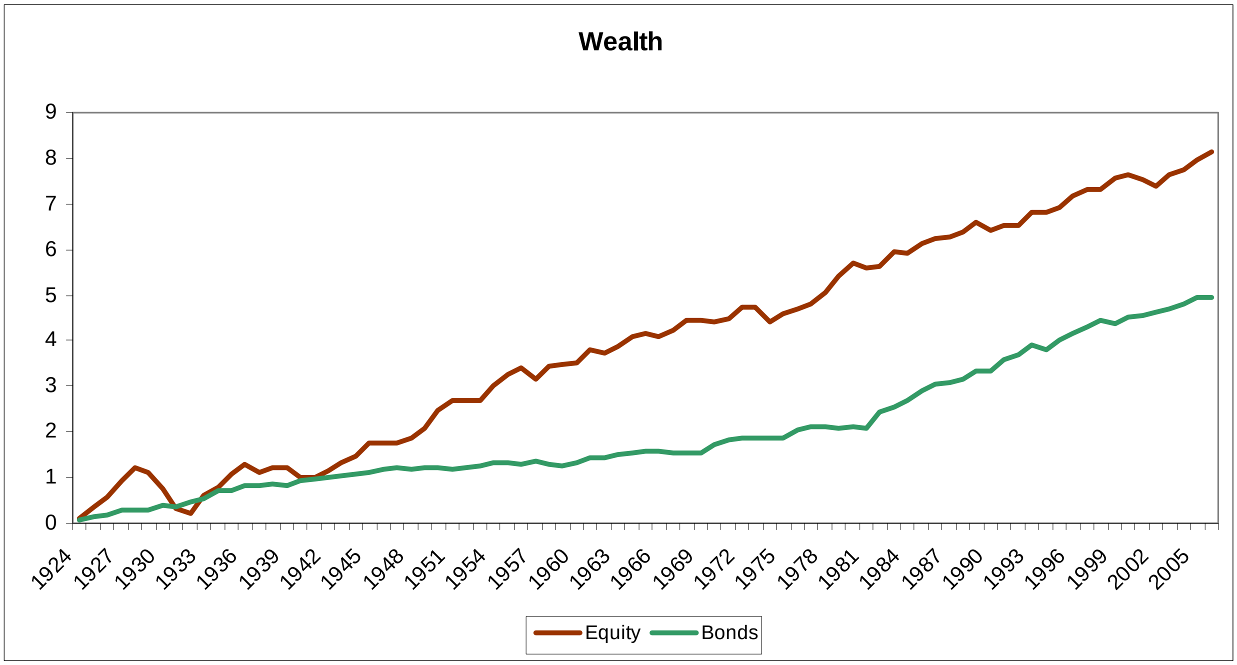
[14] See Arnott and Ryan (2002) for example.

bonds. In the following table is the earned equity risk premium for different holding periods from 1927-2007. For example, from 1967-2007 the earned equity risk premium was 2.13%, whereas from 1937-1987 it was 7.19%. What is clear from this table and the previous two graphs is that the earned equity risk premium has been declining, but the question is why?

	1927	**1937**	**1947**	**1957**	**1967**	**1977**	**1989**	**1997**
1937	-0.14							
1947	1.66	3.45						
1957	6.16	9.31	15.17					
1967	7.14	9.56	12.62	10.07				
1977	5.88	7.38	8.69	5.45	0.84			
1987	5.97	7.19	8.12	5.78	3.63	6.43		
1997	4.84	5.66	6.11	3.84	1.77	2.24	-1.96	
2007	4.63	5.31	5.62	3.71	2.13	2.56	0.62	3.20

To answer this question the following graph is a log-linear graph of the log of accumulated wealth invested in equities and bonds against time. The reason for using a log-linear graph is the problem alluded to earlier; that a 50% decline from $2 is the same as a 100% increase from $1.[15] In the case of this log-linear graph the slope is the continuously compounded rate of return. The advantage is that we can then see immediately whether there seems to be any trend in the growth rate, that is, the return on equities or bonds.

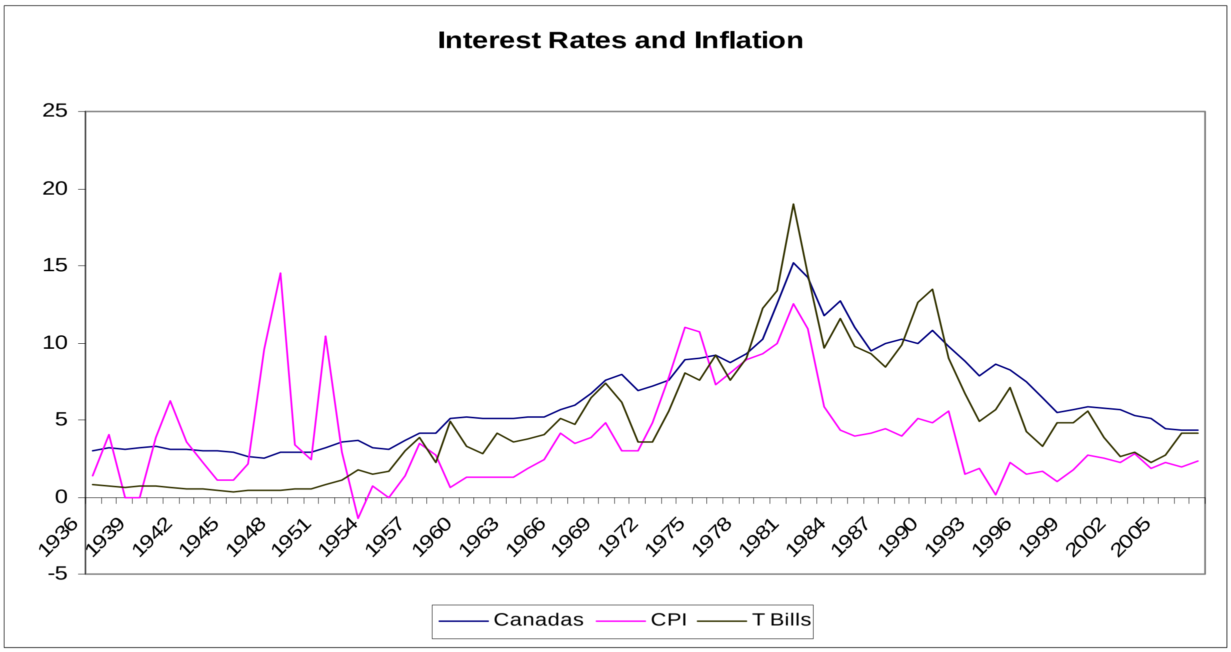
[15] Note the natural logarithm of one plus the return: log of (1+ 100%) is 0.693 and log of (1-50%) is - 0.693, so the average is 0



For the equity series there does not seem to be any long term trend, or break in the slope, but in contrast for bonds there is a clear break in the early 1980's. Before the early 1980s the slope of the bond line is clearly flatter than it is after the early 1980's. In fact after the early 1980's the slope of the bond line is pretty much the same as the equity line, which confirms the previous result that equities and bonds have delivered the same overall rates of return since then.

We can see why this break occurred simply by graphing the yields on long Canada bonds, Treasury Bills and the CPI inflation rate for this long period. The following graph shows that in the 1930's interest rates were effectively controlled with little variability. This meant that investors earned the yield on Canada bonds without significant capital gains or losses. In contrast, starting in the mid 1950's interest rates increased due to increased inflation causing capital losses on bonds, since as interest rates increase bond prices fall. This means that realised returns on bonds *underestimated* market expectations throughout this period and the earned market risk premium *exceeded* what was expected. In turn this implies that those 6.0% and 7.0% risk premium estimates in the 1980's *over-estimated* the market risk premium.

However, as inflation kept increasing eventually the Bank of Canada and the Government of Canada responded with dramatic increases in short term interest rates in 1981 and since then the process has gone into reverse. Market interest rates have fallen and bond investors have earned more than they expected as they have earned unexpected capital gains. This implies that recent estimates of the earned risk premium of 2.0% from data for the last thirty years or so *under-estimate* the market risk premium.

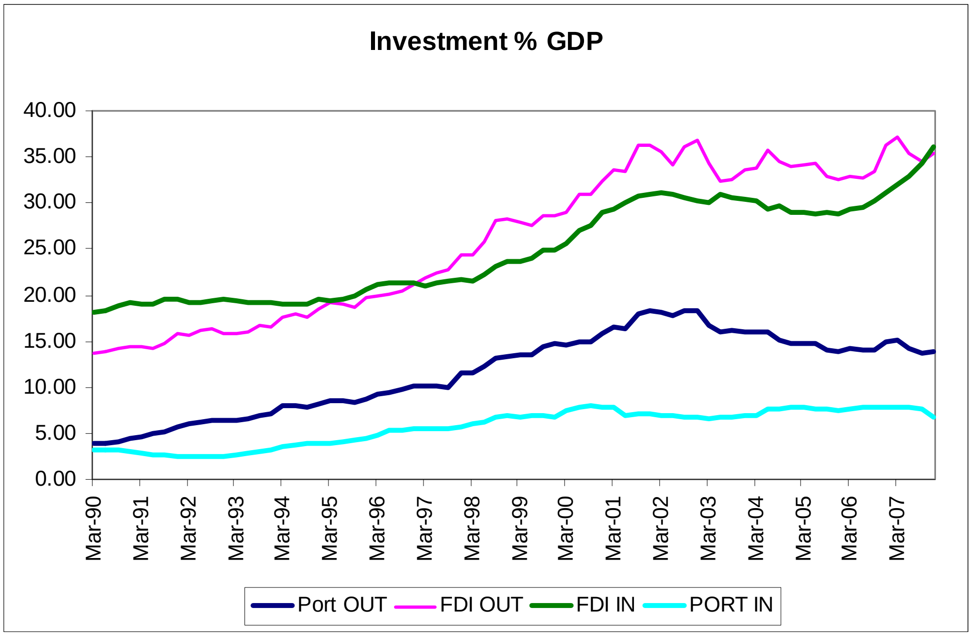


What the interest rate graph indicates is that at their current levels of just over 4.0%, long Canada bond yields are back where they were before this great inflationary increase and decrease of the last fifty years started. It also explains why recent estimates of the market risk premium of around 2.0% are biased low, just as the estimates from 20 years ago of 6% and 7% were biased high. In both cases they reflect significant changes in the level of long Canada bond yields; that in the former case generated unexpected capital gains and the latter case unexpected capital losses. With long Canada bond yields back to where they started decades ago, the overall market risk premium estimate of just above 5.0% is a reasonable estimate of the long run Canadian market risk premium.

US and World Markets

We are much more aware of international investment opportunities now than say twenty years ago. The world used to be characterized by currency restrictions, investment controls and very limited international investing opportunities. Now most currencies are freely convertible, investment restrictions have been eased and there is increased coverage of international stocks by investment advisors. This latter coverage has been enhanced by international collaboration between investment banks, the growth of some major international investment banks and the introduction of exchange treaded funds that allow Canadians to easily invest in portfolios of foreign stocks. This leads to a basic question: now that Canada is more linked with world markets is the Canadian market risk premium going to increase to the US experienced level of 6.43%, stay at the historic Canadian level of about 5.0% or move to some new world level?

To answer this question we should first look at the trends in international investment. The following graph shows in and outflows of investment by firms (foreign direct investment) and investment by individuals and financial institutions (portfolio)



It is clear that since 1990 all investment flows have increased. FDI was about 14-18% of GDP in 1990 with inbound investment exceeding outbound investment. Since then we have witnessed a dramatic increase in outbound FDI that for the last decade has exceeded inbound FDI except for 2007 when there were some major takeovers of Canadian resource firms. However, it is also apparent that FDI has largely plateaued since 2001. A similar pattern emerges for portfolio flows that increased until 2001 and then again have plateaued. In this case the dramatic increase in portfolio investment outside of Canada has actually dropped since 2002. The aggregate data confirm the well known observation that investors have a "home bias:" that they prefer to invest in securities in their own domestic market.

There are many reasons for this. The most important reason for saving is generally for retirement. As a result, foreign stocks are inherently riskier, since they involve additional foreign exchange risk. Second, the direct purchase of foreign securities involves relying on foreign securities law, since the Ontario Securities Commission, for example, only regulates information flows to securities sold to residents of Ontario. Third, the purchase of foreign securities is often still more expensive or difficult, since transactions costs, brokerage fees etc, are generally higher as trades go through multiple brokers. Fourth, evaluating foreign securities is often more complex since accounting standards differ across countries: one dollar earnings per share or a 10% return on equity can mean a variety of different things, depending on whether it is for a German, American or Canadian company. Finally, there are a variety of legal and tax impediments to foreign investing and the lingering fear that foreign investors will be treated worse than local investors in the event of serious financial troubles.

Although all of the above reasons are getting weaker, it is doubtful that they will completely disappear any time soon. Consequently the emphasis should always be on a Canadian market risk premium in estimating a fair return. Moreover, it is a basic proposition in finance that the integration of markets should *reduce* not increase the market risk premium. Cohn and Pringle (1973) analysed this question and stated

> "More importantly, the equilibrium rate of exchange of risk and return should decline for most countries, non-diversifiable risk should decline for most projects, and the resulting reduction in

the risk premium component of the cost of capital to firms should improve the efficiency of real capital allocation."

The reason for Cohn and Pringle's conclusion is that international investment reduces risk since many unique country factors are removed when held in an internationally diversified portfolio. Consider the capital market line (CML) that prices risk for a diversified portfolio.

$$E(R_m) = R_F + MPR\sigma$$

The CML states that the return on a diversified portfolio is equal to the risk free rate (R_F) plus a risk premium, which is the market price of risk (*MPR*) times the standard deviation of the portfolio's return (σ). If we take the historic data for the US and Canada as representing the actual risk return tradeoff in each market, we can estimate the market price of risk as:

$$MPR_{US} = \frac{E(R_m) - R_F}{\sigma} = \frac{.0643}{.1996} = 0.32$$

The earned US risk premium is 6.43% and is used as the risk premium over the risk free rate. In this case the market price of risk in the US is 0.32. For Canada the estimate would be

$$MPR_{CAN} = \frac{E(R_m) - R_F}{\sigma} = \frac{.0518}{18.36.} = 0.28$$

The lower estimate in Canada reflects the lower earned risk premium, which is not fully offset by the lower risk of the Canadian equity market.

Now suppose these two markets were completely segmented and then became fully integrated. This is not a valid description of reality, since in practise Canadians have always invested in the US despite the restrictions mentioned above. However, it is a useful pedagogic tool. In this case, for illustrative purposes I will take 0.30 as the market price of risk in an integrated market. The question is then: what is the risk of an integrated market, since the market risk premium is this risk times 0.30?

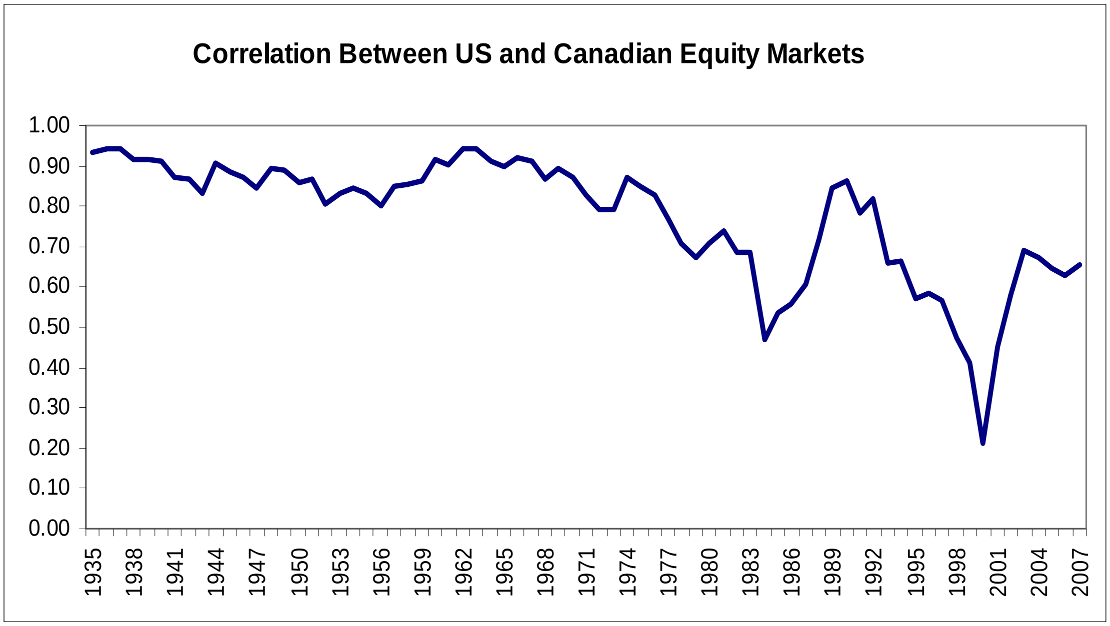
The risk of a diversified portfolio is simply the standard deviation of its returns, which is as follows

$$\sigma = (\left(\frac{V_{US}}{V_C + V_{US}}\right)^2 0.1996^2 + \left(\frac{V_C}{V_C + V_{US}}\right)^2 0.1836^2 + 2 * \rho * \left(\frac{V_{US}}{V_C + V_{US}}\right)\left(\frac{V_C}{V_C + V_{US}}\right) 0.1996 * 0.1836)\text{^}0.5$$

This estimate assumes the historic risk of the two markets and all we need are the weights, which are the relative equity market values (*V*) and the correlation (*ρ*) between their returns. In 2006 the US market value was $19.3 trillion and the Canadian market $1.7 trillion or about 11:1 roughly the relative magnitude of the population and GDP differences. In this case all we need to know is the correlation between the two markets.

If the markets were perfectly correlated then the combined market's risk would be 19.82% which is just the weighted average of the US and Canadian market risk. The Canadian market's beta with respect to the US market would then be 0.93 for a Canadian market risk premium of 5.51% or an increase from the historic estimate of 5.18% of 0.32%. However, this takes an extreme assumption, since in practise the two markets are not perfectly correlated. This is because the composition of the two equity markets differs. At schedule 1 is a table showing the composition of the Canadian market versus the US and world markets as of March 2000.

At that time, as now, there was concern that the Canadian market was heavily focused in particular sectors. In 2000 14.4% of the Canadian market was in energy and raw materials, a heavy concentration that has now increased to 40%. However, the major concern at that time was the 36.7% in tech hardware and 17.3% in telecommunications, which was Nortel. There are also many sectors which are noticeably absent in Canada, such as pharmaceuticals, retail, computer software etc. Given the differing industry composition we can not expect the two markets to be perfectly correlated and they are not. The following graph gives the correlation between the TSX Composite and the S&P500 estimated from rates of return for ten year periods.



It is clear from the figure that the US and Canadian markets were more highly correlated before the mid 1980s and since then the correlation has dropped from the 0.90 level to about 0.60.[16] The lack of perfect correlation supports the basic logic of Cohn and Pringle, that international diversification reduces risk since uniquely Canadian or US events are diversified away in an integrated portfolio. If we take the correlation as between these two levels or about 0.6-0.8, then the beta of the Canadian market with respect to this integrated market and the Canadian market risk premiums are 0.6 and 3.4% and 0.76 and 4.4% respectively. Regardless of which of these two correlation levels is chosen we get the Cohn and Pringle result that the market risk premium falls as the US and Canadian markets become integrated.

This discussion simply confirms the standard conclusion from financial theory that as markets integrate, risk is reduced as unique national factors get diversified away in a globally diversified portfolio. Consequently there will be a tendency for the market risk premium to fall in all countries, such that both the historic Canadian and US market risk premiums would be biased high estimates of a forward looking market risk premium. However, in my judgment the Canadian and US markets have always been partially integrated and the impact of any

[16] Brean (2000) estimates the correlation at 0.82.

increased cross border capital flows is not significant. Consequently I judge the Canadian market risk premium to be about 5.0%.[17]

Utility Risk

The previous discussion has estimated the return on the stock market as a whole at about 9.50%. This is a forward looking estimated based on a forecast long Canada bond yield of about 4.5% and a current market risk premium of 5.0%. The question is then how do we adjust this estimate for the market as whole *downward* to reflect the lower risk of regulated utilities?

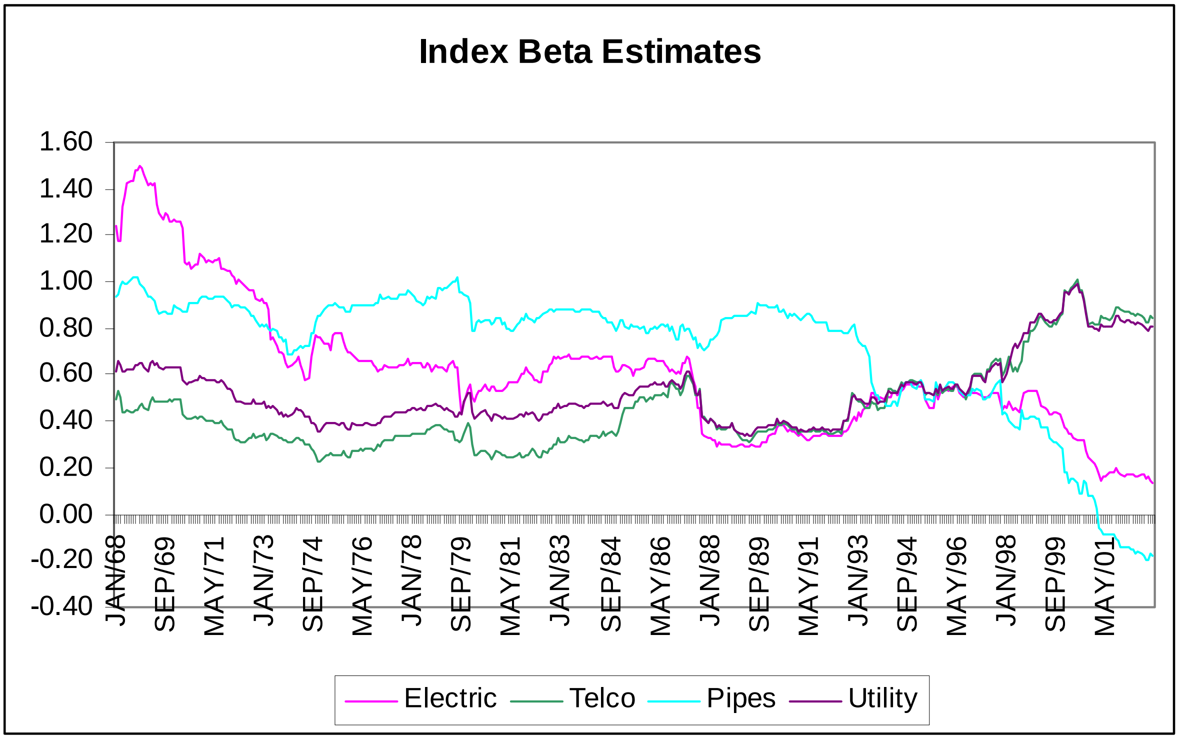
In Schedules 2 and 3 are the earned and allowed ROEs for two samples of Canadian utilities. The first is for the pipelines controlled by TransCanada and the second the major gas distribution utilities. The data comes from various regulatory filings and reflects the amount of risk that each utility has been exposed to. If the utilities were risky we would expect that the actual ROE would fluctuate around the allowed ROE to reflect this risk and this fluctuation would be larger for the more risky utilities. However, it is immediately obvious from this data that Canadian utilities consistently earn their allowed ROEs. In fact the pipelines generally over earn their allowed ROE by 0.20-0.30%, whereas the gas utilities over earn by more depending on whether they have weather normalisation accounts and performance based regulation (Terasen Gas and GMI) or they don't (Enbridge and Union Gas).

From the earned versus allowed ROE data it is clear that utilities in Canada have very little short term business or financial risk. For at least the last twenty years they have consistently over earned their allowed ROE and there is no evidence of any change in this ability, that is, there has been no change in their risk profile. This assessment is unlike the situation of similar utilities in the US, where regulation is not as protective as in Canada.[18]

What these schedules indicate is that most utility risk comes from the capital market in the way in which investors revise their expectations about the firm's prospects causing their prices to change. This capital market perspective is the reason why regulators have placed primary

[17] This is slightly greater than the recent estimate of 4.43% for the US by Easton and Summers (2007)
[18] For example, there is more regulatory lag in the US and less use of deferral accounts which pass on the cost of unexpected events to ratepayers

reliance on the CAPM, where the risk measures (beta) measures the amount of risk a share adds to a diversified portfolio.[19] In the following graph is the beta of the main indexes up until 2002.

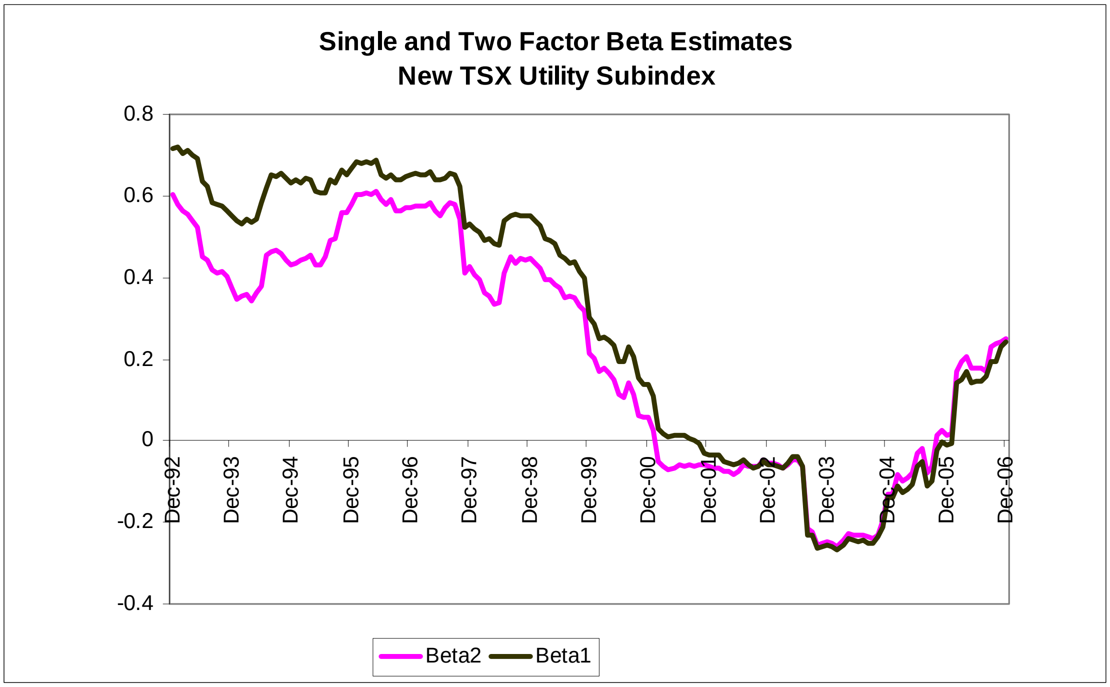


In 2002 Standard and Poors took over the maintenance of the TSE's[20] indexes and converted them into their global industry classification system (GICS). As a result we lost some of the industry specific indexes. Further these estimates are for the utility holding companies (UHCs), rather than the pure utility operations and thus over estimate their risk. However, it is clear from the above graph that utility risk is generally below the average risk of the market, which is 1.0. In fact, you have to go back thirty years to get betas that are close to 1.0 for any of the different classes of UHCs. Further the utility and Telco risk measures for the period 1996-2002 were highly affected by Bell Canada Enterprises' holdings of Nortel and the fact that BCE was the largest component of the Telco and the utility index. Ignoring the Nortel effect of the

[19] The key contribution of beta is to show how a security's return covaries with that on the market, since this risk can-not be removed through diversification. It is thus risk from the point of view of an investor holding a diversified portfolio.
[20] The Toronto Stock Exchange has also been rebranded from the TSE to the TSX.

internet bubble and crash, it is clear that Pipeline and Electric risk has been declining over the period 1993-2002.

Since 2002 the new TSX utility index has the following beta coefficient



The estimates are from two ways of estimating beta: the first is the standard way where the only independent variable is the return on the market and the second also includes the impact of interest rate. This latter method recognises the fact that utilities are interest sensitive stocks with a very high dividend component to their return.

Both estimation procedures give the same basic result. From 1992-2000 the beta estimates are similar to those from the old TSE indexes: they decline from the 0.50 level to 0 by the early 2000's. Further the more recent data shows the betas going negative in 2003-4 before recovering to 0.20. All these estimates cover five years of data so the latest 2006 estimates are for the period 2002-2006 and cover the gradual recovery from the slowdown of 2001-2. What they indicate is that these UHCs did not exhibit the sharp drops of the market as a whole in the 2001-3 bear market or the large increases in the bull market that followed. In other words they are low risk and much less volatile than the market as a whole, which is what we expect from low risk securities!

Overall I continue to use a beta estimate of no more than 0.50 for Canadian utilities which means a 250 basis point utility risk premium. If this is added to a flotation cost allowance of 0.50% and a forecast long Canada bond yield the fair ROE for a Canadian utility is about 7.50%, which is less than the current formula allowed ROE.

Fairness Revisited

To return to the fairness of currently allowed ROEs it is important to remember that Mr, Justice Lamont's definition specifically looked at investment opportunities available in other ***securities*** similar to that of the company in question. This is because investors can only invest in the securities issued by corporations; they can not directly earn the accounting Return on Equity (ROE) earned by those corporations. To earn those accounting ROEs an investor has to buy the company's shares at the prevailing market price, and it is a general principle that if these prices are in excess of the firm's book value, that is, the market to book ratio is over 1.0, then the investor earns a lower rate of return than the company.

In principle a market to book ratio over 1.0 indicates that the investor's fair or required rate of return is *less* than the return being paid and vice versa. This principle is particularly appropriate where the stream of income is predetermined as for a long Canada bond, or as it largely is for a utility on an automatic adjustment mechanism that consistently earns its allowed ROE. It is not so relevant for competitive, non-regulated firms where the book value has less direct links to the firm's revenue stream and where valuable assets are not reported on the balance sheet.[21]

For example, suppose the Government of Canada (GOC) issues long term bonds with a 5% coupon or stated interest rate, when the market interest rate is 5%, so they are issued at par. However, subsequently interest rates fall. These bonds would then sell at a premium to their par value, since their coupon exceeds the current or required rate of return. We could say that

[21] R&D and brand names, for example, are valuable assets that generate revenues and profits but are not normally reported as assets so that their value is not included in book equity, but is included in their market value.

the market to book ratio for these bonds (price to par value) exceeds 1.0, but in practice we simply say that the bonds are selling at a premium. However, the pricing of bonds shows us immediately that a high price to book (par) ratio indicates that the required return is less than the return promised on the bond.

For utilities, although the ROE varies, usually through the adjustment mechanism, it is still tied directly to the historic rate base. So for example we can see the same principle applying in acquisitions. Suppose there is a highly profitable utility earning 20% on its $1 million book value, but another utility requires only a 10% return and acquires it for twice book value or $2 million. In this case purchase accounting requires that the excess paid over the book value of the acquisition be recorded as goodwill on the acquiring firm's balance sheet. As a result the acquiring firm only earns 10% on its $2 million investment, that is, the original book value plus the goodwill. In this case we can see directly that the original 20% ROE was excessive given a market to book value of 2.0, whereas after the acquisition the new ROE of 10% on the purchase price more accurately reflects the fair return.[22]

What the above comments mean is that observing transaction prices for the sale of regulated utility assets is a valuable check for a utility commission. If these assets are sold significantly above book value it means that either the allowed ROE is too high or that somehow the buyer is able to wring more value out of these assets. Utility witnesses often argue that it is the latter, that there are strategic gains to buying regulated utility operations, rather than the former that drive transaction market to book prices. However, a careful analysis of these synergies makes it difficult to see how they could possibly generate market prices approximately 70% higher than the book value as recently occurred in Fortis' 2007 acquisition of Terasen Gas unless the allowed ROE is too high.[23] Utility commissions can, therefore, take some comfort in the fact that these acquisition market to book ratios indicate that current formula allowed ROEs are not too low.

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[22] More accurately, since the acquisition will only be made if the purchase price is less than the value of the assets. that is, the implicit market to book ratio of the acquirer is still above 1.0.

[23] This is an equity market to book ratio.

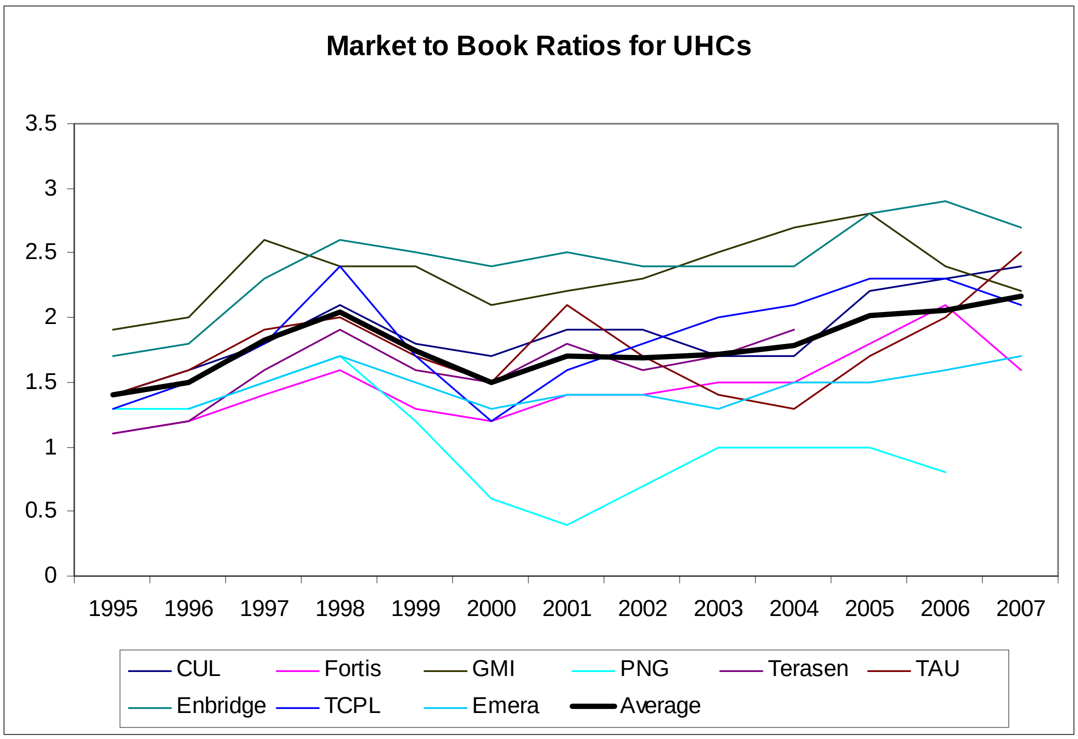
As a final observation, note that a fair return can be either a *nominal* return, that is, fixed in actual dollars or a *real* return, that is, in constant dollars indexed to inflation to maintain its purchasing power.

Consider, for example the long term financing options open to the Government of Canada. It can either issue fixed rate nominal bonds or real return bonds. As of October 28, 2008 the yield on the fixed rate long term bond was 4.12%. An investor buying this bond knows exactly how much they will receive in fixed nominal Canadian dollars over the 30 year period, but they do not know the purchasing power of those dollars, since the future inflation rate is unknown. In contrast, they can buy the real return bond which yielded 2.44%. This bond has its principal linked to the consumer price index and the fixed coupon rate is applied to this inflation-linked principal. In this case, the principal increases with inflation, so that at maturity it exceeds the original par value by the cumulative impact of inflation. The real return bond gives the investor an inflationary capital gain at the expense of a lower initial interest return. The break-even inflation rate (BEIR), which is the difference between the nominal and real yields of 1.68%, is the break even capital gain on the inflation linked bond that sets the rates of return on these two bonds equal.

The example of the real return and the nominal bond indicates that there are two possible ways of awarding a fair return to the shareholder. One way is to award a real return and then index the rate base to the inflation rate, similar to the real return bond. The other is to use an historic rate base and apply a nominal return, similar to the conventional long Canada bond. What the regulator should not do is apply a nominal return to an inflation indexed rate base, since this rewards the investor twice for the impact of inflation. Fortunately no regulator in Canada does this. Instead Canadian regulation has opted for an *historic cost* rate base and the application of a *nominal* rate of return.

What this means is that, like the nominal bond, investors in utility shares are compensated for inflation and risk by being awarded a fair ***nominal*** rate of return. This also means that if the utility is stable and there is no growth in rate base, so all the earnings are paid out as a dividend, as long as the return is fair the investor should not earn a capital gain. If the utility is growing and earnings are being reinvested in a growing rate base the investor receives a capital gain from the increase in retained earnings with the opposite happening for a declining rate base firm. However, in all three cases, the market to book ratio for the firm should not systematically change and only exceed 1.0 due to flotation and other issue costs. Otherwise, by definition the shareholders have earned an unfair rate of return.[24]

The major insight from these basic financial principles is that whether or not the allowed ROE is fair or not can be judged in part by looking at the market to book ratios of the major UHC's, which are graphed below.



What is clear is that except for Pacific Northern Gas, which has lost a single customer and most of its load,[25] the UHC's market to book ratios are all well above 1.0. Not only that, but since 1994 when many of these utilities were put on automatic adjustment mechanisms the general trend has been upward. From this data on market to book ratios it is clear that the NEB type

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[24] This is not to say that regulation should be keyed to the market to book ratio, but only that it is a signal of the fairness of the allowed ROE and used as a reasonableness check.

[25] PNG's major customer Methanex accounted for about 62% of PNG's load and shut down

ROE formulae have not hurt the utilities. In fact the market to book ratios of these UHCs gives the opposite result and implies that ROE adjustment mechanisms have been generous towards the utilities and that the fair ROE is somewhat lower.

Conclusions

The key issues in estimating the fair ROE for a public utility are relatively clear: the return has to be a fair rate of return on other securities in the capital market of equivalent risk. The return is not a return earned by other companies, since such returns are not an opportunity cost and investors can only access those returns by paying the market price for those securities. Further such returns are average accounting returns and do not reflect the marginal economic rate of return earned by those firms.[26] Once we look at the capital market we have several decades of history to judge what the typical market risk premium is in Canada over long Canada bonds. There have been a variety of estimates of the market risk premium and most of the debate stems from not understanding how the bond market has changed and the fact that Canada bond yields were affected in a material way by the huge deficits run by the GOC until the late 1990's.

Once we understand the bond market changes that have occurred since governments in Canada have got their deficits under control, we can understand why the market risk premium was low in the 1990s and has subsequently reverted to more normal levels. This also explains why the ROE adjustment models have worked so well in practice: they have increased the utility risk premium over long Canada bonds as this bond yield has gone down to more normal levels. Further this market risk premium should decline marginally as markets become more international in scope and investors diversify away some of the unique risk attached to the Canadian equity market. However, in my judgement such declines are minor.

[26] Note even if a firm has access to a higher ROE on investments in another jurisdiction this has nothing to do with a fair return since it will continue to invest as long as the return exceeds its fair return, that is, a project has a positive Net Present Value and creates wealth for the share owners.

Finally, there is no question that utilities are low risk. The evidence of earned versus allowed ROEs indicates that they generally have no problem earning their allowed ROE and tend to over-earn. Moreover, there is no indication that this pattern has changed materially over the last twenty years. Instead what the data indicates is that most utility risk is simply capital market risk. Even here the evidence from utility holding companies is that they have much less risk than the overall equity market as indicated by the low betas.

The fact is that the evidence indicates that utilities are very low risk and investors treat them as such and require relatively low required rates of return to invest in them. This is confirmed by the fact that investors have bid up the share prices of Canadian UHCs, since their allowed utility ROEs exceed investor required rates of return.

Schedule 1

Table 1: Morgan Stanley Industry Composition (March 2000) (Percentage of total market value)

	Canada	U.S.A.	Europe	Far East	ACWI[1]
Energy	7.3	4.6	7.3	0.3	4.9
Materials	7.1	2.6	3.7	4.5	4.0
Capital Goods	3.7	8.0	4.9	8.7	6.8
Commercial Services	0.1	1.2	1.0	1.7	1.1
Transportation	1.8	0.7	1.4	3.3	1.3
Autos	0.6	1.4	1.9	9.5	2.7
Consumer Durables	0	0.8	1.9	10.1	2.5
Hotels & Restaurants	0	0.9	0.9	0.7	0.8
Media	10.4	5.0	3.4	1.2	4.1
Retail	0.4	6.1	1.7	2.0	3.8
Food & Drug: Retail	1.0	0.8	1.7	0	1.0
Food, Beverage & Tobacco	0.3	2.7	3.7	2.2	3.0
Household & Personal	0.1	1.6	0.8	1.0	1.2
Health Care	0.4	1.6	0.4	0.7	1.0
Pharmaceuticals	0	7.4	8.1	4.3	6.6
Banks	9.5	4.7	11.7	10.1	8.2
Diversified Financials	1.0	4.5	1.7	7.8	4.0
Insurance	0.3	2.8	6.8	0.7	3.7
Real Estate	0	0.2	0.6	3.1	0.8
Software	0.1	11.0	2.5	3.7	6.7
Tech Hardware	36.7	22.3	9.0	14.3	16.8
Telecommunications	17.3	6.5	19.4	7.7	11.6
Utilities	2.0	2.5	5.3	2.5	3.5

[1] All-Country World Index.

Source Booth (2000)

Earned vs Allowed NEB Pipelines

	Mainline		Foothills		TCPL BC (ANG)		TQM		
	Allowed	Actual	Allowed	Actual	Allowed	Actual	Allowed	Actual	A spread
1990	13.25	13.34	14.25	14.25	13.25	13.25	13.75	14.87	122
1991	13.5	13.65	14.25	14.25	13.38	13.38	13.75	13.94	110
1992	13.25	13.43	13.83	13.83	13.43	13.43	13.75	13.97	117
1993	12.25	12.31	11.73	11.73	12.08	12.08	12.25	12.5	107
1994	11.25	11.16	11.5	11.5	12	12	12.25	12.55	76
1995	12.25	12.56	12.25	12.25	12.25	12.25	12.25	12.65	70
1996	11.25	11.83	11.25	11.25	11.25	11.25	11.25	11.83	52
1997	10.67	11.15	10.67	10.67	10.67	10.67	10.67	10.94	54
1998	10.21	10.63	10.21	10.21	10.21	10.21	10.21	10.32	87
1999	9.58	9.64	9.58	9.58	9.58	9.58	9.58	9.94	98
2000	9.9	9.99	9.9	9.9	9.9	9.9	9.9	9.96	151
2001	9.61	9.72	9.61	9.61	9.61	6.86	9.61	10.21	129
2002	9.53	9.95	9.53	9.53	9.53	9.53	9.53	9.8	126
2003	9.79	10.18	9.79	9.79	9.79	8.21	9.79	10.21	97.37
2004	9.56	9.83	9.56	9.56	9.56	9.56	9.56	9.84	95.2
2005	9.46	9.66	9.46	10.14	9.46	9.46	9.46	9.92	100.1
2006	8.88	8.92	8.88	9.53	8.88	8.47	8.88	8.99	102.5
2007	8.46	9.13	8.46	8.89	8.46		8.46	8.74	127.17
Average	10.70	10.95	10.82	10.92	10.74	10.59	10.83	11.18	315.03
ovrearn		0.25		0.10		-0.14		0.35	

Earned vs Allowed Gas LDCs

		EGDI		UNION		Terasen		GMI	ATCO Gas	
	Allowed	Actual	Allowed	Actual	Allowed	Actual	Allowed	Actual		
1990	13.25	13.60	13.50	13.40			14.25	14.25		
1991	13.13	13.29	13.50	12.50			14.25	14.25		
1992	13.13	13.40	13.00	13.70	12.25	9.06	14	14		
1993	12.30	14.43	12.50	14.30	na	11.91	12.5	12.5		
1994	11.60	12.49	11.75	12.14	10.65	9.73	12	12.04		
1995	11.65	12.66	11.75	12.12	12.00	12.03	12	11.78		
1996	11.88	13.14	11.75	12.52	11.00	11.80	12	12.04		
1997	11.50	13.00	11.00	12.28	10.25	11.27	11.5	11.9		
1998	10.30	11.97	10.44	11.14	10.00	9.70	10.75	11.09		
1999	9.51	10.77	9.61	10.10	9.25	9.97	9.64	10.22		
2000	9.73	10.83	9.95	10.11	9.50	10.12	9.72	10.06		
2001	9.54	10.03	9.95	11.45	9.25	9.31	9.6	10.38	9.75	9.58
2002	9.66	11.81	9.95	12.38	9.13	10.03	9.67	10.67	9.75	9.77
2003	9.69	9.74	9.95	12.08	9.42	10.23	9.89	10.82	9.50	10.68
2004	9.69	10.66	9.62	11.51	9.15	9.31	9.45	11.47	9.50	10.42
2005	9.57	9.46	9.62	10.99	9.03	10.09	9.69	10.51	9.50	8.00
2006	8.74	8.86	8.89	10.28	8.80	9.82	8.95	9.66	8.93	9.74
2007	8.39	9.78	8.54		8.37	9.55	9.05	9.91	8.51	11.02
Average	10.74	11.66	10.85	11.94	9.87	10.25	11.05	11.53	9.35	9.89
Overearn		0.93		1.09		0.38		0.48		0.54

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